

**APPENDIX C**  
**OXBOW COMPLEX ECOLOGICAL EVALUATION**

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## APPENDIX C: OXBOW COMPLEX ECOLOGICAL EVALUATION

The report titled Wetland Delineation For St. Maries River Study Areas (SELKIRK ENVIRONMENTAL 1999) identified six relatively high value wetland areas within the overall, moderately valued wetland complex. This report has stated:

*"Within the context of a moderately valued wetland, specific areas within the wetland complex may be considered as generally low value and others as generally high value. The low value areas are the farmed wetlands where there is relatively short-term hydrology and a broad expanse of emergent vegetation lacking shrubs or trees. Edge effect is not present and the dominant plant species are seeded pasture grasses. The high value areas would be those areas where shallow and deep emergent, and shrub and tree species inter finger, providing a maximum edge effect and diversity of habitats in a small space. The same high value may be assigned where the spectrum of hydrologic conditions from seasonally shallow to permanently deep inundation can be found in close proximity."*

Five of these relatively high value areas are within the proposed permit areas. These areas, shown in Figure 2-1, are oxbow complexes that have been truncated from the main stem of the St. Maries River by typical fluvial processes. A brief description of each oxbow complex follows. See the wetland report for additional descriptions of plant communities and hydrology.

**Oxbow Complex 1:** This complex totals 2.8 acres. It has emergent, scrub-shrub, and open water habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne, alder, and dogwood. It has less than 20 percent tree canopy of black cottonwood, cedar, and spruce. This complex has areas that are seasonally saturated, semi-permanently inundated and saturated, and permanently inundated/saturated. Hydrologic support is from seasonal run-off, precipitation, and floodflows.

**Oxbow Complex 2:** This complex totals 9.4 acres. It has emergent, scrub-shrub, and open water habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne, alder, willow, and dogwood. It has less than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated, semi-permanently inundated and saturated, and permanently inundated/saturated. Hydrologic support is from seasonal run-off, precipitation, floodflows, and stream water contribution from Pierce Creek, as seasonal system.

**Oxbow Complex 3:** This complex totals 9.5 acres. It has emergent, scrub-shrub, forested, and open water habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne, alder, willow, and dogwood. Forested vegetation is dominated by a greater than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated, semi-permanently inundated and saturated, and permanently inundated/saturated. Hydrologic support is from seasonal run-off, precipitation, floodflows, and stream water contribution from Hatton Creek, as seasonal system.

**Oxbow Complex 4:** This complex totals 6.8 acres. It has emergent and scrub-shrub habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne and alder. It has less than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated and semi-permanently inundated and saturated. Hydrologic support is from seasonal run-off, precipitation, and floodflows.

**Oxbow Complex 5:** This complex totals 4.3 acres. It has emergent and scrub-shrub habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne and alder. It has less than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated and semi-permanently inundated and saturated. Hydrologic support is from seasonal run-off, precipitation, and floodflows.

Although the wetland report identified these oxbow complexes as relatively high value areas, they are not irreplaceable, high value systems in absolute terms or by regulatory definition. They are not any of the following;

- Natural Heritage sites,
- candidates for natural Heritage sites,
- inter-tidal systems,
- complex forested wetlands,
- rare peat systems, or
- habitat for rare, threatened, or endangered plants or animals.

At the request of the Corps of Engineers, these five oxbow complexes have been ranked according to relative ecological value for consideration in the Oxbow Avoidance Alternative. This ranking was accomplished by utilizing the Rationale for Wetland Functional Evaluation in Appendix E of the wetland report. This rationale was modified to include the edge-effect benefits of upland pockets within a wetland complex, and is shown in Table A - Oxbow Complex Function Evaluation. In this table the complex number is recorded for each applicable functional characteristic. The number of "hits" or occurrences for each complex is then summed for low, moderate, and high value criteria.

Table B - Summary of Occurrences for Oxbow Complexes shows the number of low, moderate, and high occurrences for each oxbow complex. The ranking is based on a simple sum of the occurrences, weighting is not used. The highest ranked complexes are those with the greatest number of high value occurrences, i.e., Complex 2 is rated first because it has the most (7) high occurrences. Where the number of high occurrences tie (complexes 4 and 5), moderate occurrences are used as a 'tiebreaker'.

**Table A - Oxbow Complex Function Evaluation**

	Criteria for Lower Value	Complex Occurrence	Criteria for Moderate Value	Complex Occurrence	Criteria for Higher Value	Complex Occurrence
<b>Hydrologic Support</b>	isolated depression		open drainage system	1-2-3-4-5	open tidal system	
	temporary saturation or inundation	1-2-3-4-5	seasonally flooded	1-2-3-4-5	permanent saturation	1-2-3-4-5
	2 sources of hydrologic support		semi-permanently flooded	1-2-3-4-5	permanent inundation	1-2-3
			3 sources of hydrologic support	1-4-5	4 or more sources of hydrologic support	2-3
<b>Storm / Flood Abatement</b>	in remote settings		in rural settings	1-2-3-4-5	in urban settings	
	< 10 % woody vegetation		10 - 30 % woody vegetation	1-2-3-4-5	> 30 % woody vegetation	
<b>Groundwater Exchange</b>	isolated depressions		seasonally flooded open system	1-2-3-4-5	permanently flooded system	1-2-3
	temporarily saturated or inundated	1-2-3-4-5	permanent shallow inundation	1-2-3	deep inundation	
	impermeable substrate		semipermeable substrate	1-2-3-4-5	permeable substrate	1-2-3-4-5
<b>Water Quality Improvement</b>	intermittently flooded wetland	1-2-3-4-5	lakes		estuary or perennial stream	
	< 50 % vegetation density		50 - 80 % vegetation density	1-2-3-4-5	> 80 % vegetation density	
	no proximity to non-point discharge		downstream from non-point discharge	1-2-3-4-5	downstream from municipal point discharge	
	retains < 25 % of overland runoff	1-2-3-4-5	retains 25 - 50 % of overland runoff		retains > 50 % of overland flow	
<b>Natural Biologic</b>	emergent improved pasture	1-2-3-4-5	shrub / forested swamp	1-2-3-4-5	marsh or bog	
	isolated system		upper tidal marsh		intertidal marshes	
	associated with ephemeral streams	2-3	associated with intermittent stream		associated with permanent stream	1-2-3-4-5
	low plant community diversity		moderate plant community diversity	1-2-3-4-5	high plant community diversity	
<b>Support</b>	low edge effect		high edge effect among wetlands	1-2-3-4-5	high edge effect among wetlands & uplands	
	special habitat features lacking	1-2-3-4-5	special habitat features present		complex special habitat features present	
	<10% and >50% upland pockets	5	30% to 50% upland pockets	1-3-4	10% to 30% upland pockets	2
	no unique species	1-2-3-4-5	unique species potentially present		unique species present	
	no water dependent species		water dependent species potential	1-2-3-4-5	water dependent species present	

Complex	Lower Occurrence	Moderate Occurrence	Higher Occurrence	Value Rank
1	7	16	5	3
2	8	14	7	1
3	8	15	6	2
4	7	15	3	4
5	8	14	3	5
Totals	38	74	24	

**Table B - Summary of Occurrences for Oxbow Complexes**

Complex	Low Occurrence	Moderate Occurrence	High Occurrence	Value Rank
1	7	16	5	3
2	8	14	7	1
3	8	15	6	2
4	7	15	3	4
5	8	14	3	5
Totals	38	74	24	

The value rank of each oxbow complex is used as one criteria in the assessment of oxbow avoidance. Table 2-1 lists this ranking as well as other oxbow complex characteristics and criteria for avoidance evaluation.

**Table C. Oxbow Complex With Buffer Data**

Data Item	OxCom 1	OxCom 2	OxCom 3	OxCom 4	OxCom 5
<b>Oxbow Complex</b>					
PEM1E		1.70 ac	2.30 ac		0.90 ac
PEM1F		2.00 ac	2.20 ac		1.80 ac
PEM1H			2.20 ac		
PSS1E	1.60 ac	4.30 ac	0.80 ac	4.40 ac	0.40 ac
PSS1F	0.30 ac	0.70 ac		1.10 ac	
PFO1E			0.45 ac		
POWH	0.20 ac	0.30 ac			
Total Wetland in Complex	2.10 ac	9.00 ac	7.95 ac	5.50 ac	3.10 ac
Dry Meadow		0.40 ac	1.55 ac	0.80 ac	0.65 ac
Shrub/Cottonwood				0.50 ac	0.55 ac
Deciduous Forest					
Coniferous Forest	0.70 ac				
Total Upland in Complex	0.70 ac	0.40 ac	1.55 ac	1.30 ac	1.20 ac
Total Oxbow Complex	2.80 ac	9.40 ac	9.50 ac	6.80 ac	4.30 ac
<b>Buffer Area</b>					
PEM1E	0.15 ac	5.0 ac	0.90 ac	0.40 ac	0.20 ac
PEM1F					
PEM1H					
PSS1E	1.30 ac	0.90 ac		0.30 ac	0.10 ac
PSS1F	0.05 ac				
PFO1E			0.05 ac		
POWH					
Total Wetland in Buffer	1.50 ac	5.90 ac	0.95 ac	0.70 ac	0.30 ac
Dry Meadow	2.30 ac	5.30 ac	6.95 ac	4.00 ac	3.00 ac
Shrub/Cottonwood					0.40 ac
Deciduous Forest					
Coniferous Forest					
Total Upland in Buffer	2.30 ac	5.30 ac	6.95 ac	4.00 ac	3.40 ac
Total Buffer	3.80 ac	11.20 ac	7.90 ac	4.70 ac	3.70 ac
Total Wetlands	3.60 ac	14.90 ac	8.90 ac	6.20 ac	3.40 ac
Total Uplands	3.00 ac	5.70 ac	8.50 ac	5.30 ac	4.60 ac
Total Complex with Buffer	6.60 ac	20.60 ac	17.40 ac	11.50 ac	8.00 ac